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FLOOD INSURANCE STUDY

VILLAGE OF GALATIA,
SALINE COUNTY,
ILLINOIS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Village of Galatia, Saline County, Illinois, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

This Flood Insurance Study was prepared by compiling existing hydrologic and hydraulic technical and scientific data prepared originally for purposes other than the National Flood Insurance Program. The data were identified as the best available at the time of compilation of this Flood Insurance Study and should depict the general conditions of the flooding sources with relative accuracy. The Federal Emergency Management Agency (FEMA) performed a cursory review and accepted the data as valid for purposes of this Flood Insurance Study and the National Flood Insurance Program. However, if better information is known to exist or has been developed since the date of this report, the information should be immediately forwarded to the Natural and Technological Hazards Division, Federal Emergency Management Agency, Chicago, Illinois, for consideration for revision of this study.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were obtained from "Inventory and Analysis of Urban Water Damage Problems, Village of Galatia, Saline County, Illinois" (Reference 1).

1.3 Coordination

On July 22, 1985, the results of this Flood Insurance Study were reviewed and accepted at a final coordination meeting attended by representatives of the community and FEMA.

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2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of Galatia, Saline County, Illinois. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected based upon the extent and validity of available existing hydrologic and hydraulic data.

Flooding caused by overflow of Gasaway Branch within the corporate limits, Tributary A from the mouth to about 300 feet upstream of McKinley Street, and Tributary B from the mouth to McKinley Street was studied in detail.

Approximate methods of analysis were used to study all remaining areas having a potential flood hazard that did not have detailed scientific or technical data available.

2.2 Community Description

The Village of Galatia is located in northern Saline County in southern Illinois, about 150 miles southeast of St. Louis, Missouri. It is surrounded by the unincorporated areas of Saline County. The major transportation routes through the village are State Route 34 and the Illinois Central Gulf Railroad. In 1980, the population was reported to be 1,042 (Reference 2).

The topography of Galatia varies from rolling to hilly. The soils are mainly the Zipp-Patton-Hurst Association. This association is characterized by nearly level, poorly drained soils (Reference 3).

The climate in the area is characterized by warm to hot summers and cool to cold winters. Generally more than 60 percent of the precipitation occurs from April through September. The average rainfall is 38 inches annually, ranging from a minimum of 24 inches to a maximum of 58 inches. Air temperature ranges from a monthly average minimum of 25 degrees Fahrenheit (F.) to a monthly average maximum of 90 degrees F. Freezing temperatures normally occur between mid-October and mid-April.

2.3 Principal Flood Problems

Flood problems in the Village of Galatia are due to overbank flooding from the Gasaway Branch, Tributary A, and Tributary B, which can occur during intense storms of 2 or more inches that have a duration of at least 2 to 3 hours. However, flooding in the village takes place in the lower, mostly undeveloped areas. Flooding does not become significant until the elevation of the 100-year flood is exceeded. Apparently, overbank flooding is caused by low channel conveyance and restricted bridge openings.

2.4 Flood Protection Measures

Flood protection measures do not exist within the study area.

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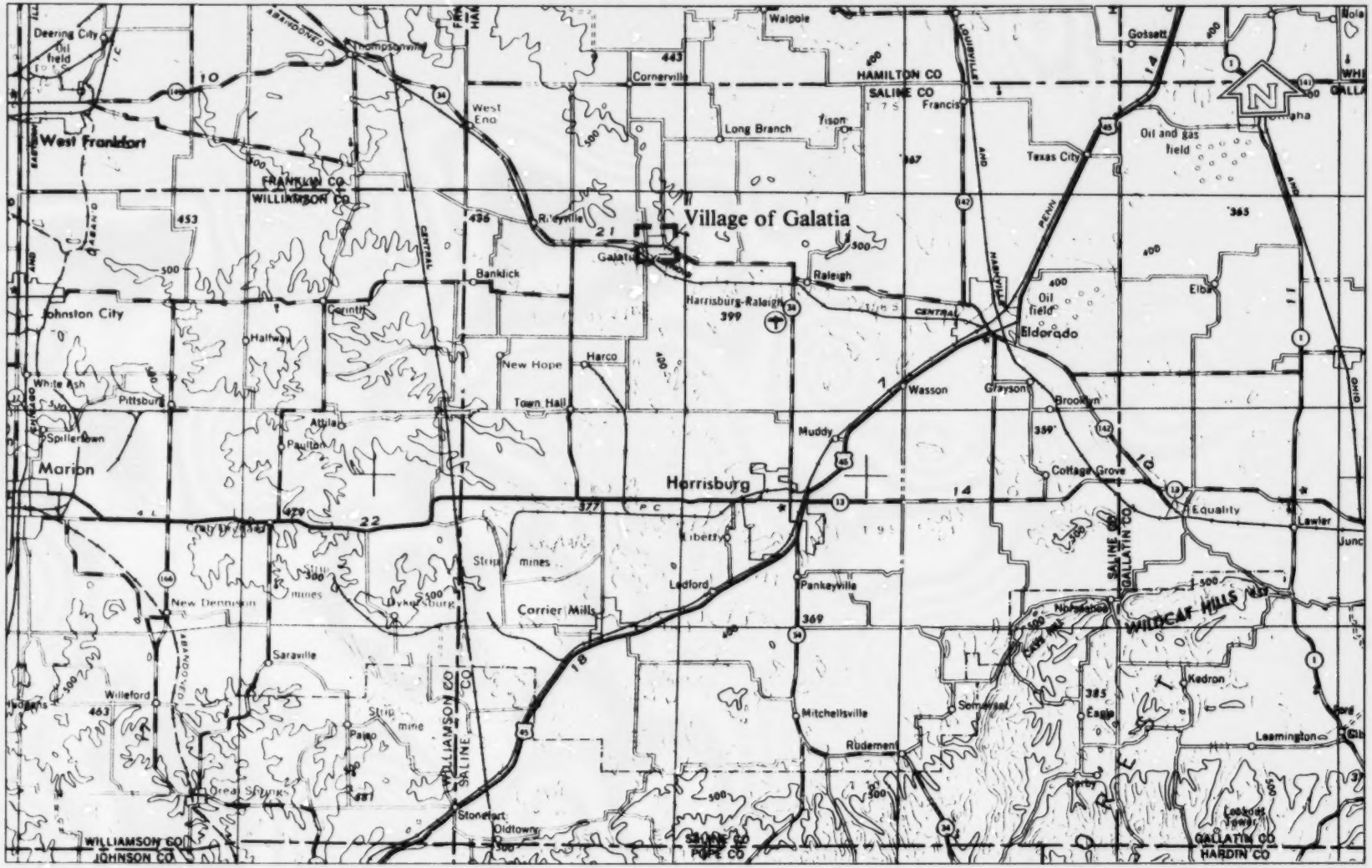

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF GALATIA, IL
(SALINE CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

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3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each riverine flooding source studied in detail affecting the community.

Peak discharges for Gasaway Branch, Tributary A, and Tributary B were determined using regression equations based on the relationship between drainage area, stream slope, rainfall intensity, and an areal adjustment factor as described in the U.S. Geological Survey publication (Reference 4).

Peak discharges for the 10-, 50-, and 100-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
GASAWAY BRANCH					
at County Road	5.8	1,278	1,967	2,261	N/A
at State Route 34	5.3	1,265	1,950	2,244	N/A
TRIBUTARY A					
at Park Street	N/A	224	354	411	N/A
at Walker Street	N/A	211	336	390	N/A
TRIBUTARY B					
at Park Street	N/A	240	380	441	N/A
at Smith Street	N/A	218	348	405	N/A

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3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections for the backwater analysis of the streams studied in detail were obtained by field surveys.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles. For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Map.

Roughness factors (Manning's "n") used in the hydraulic computations were assigned on the basis of field inspection of flood plain areas. The Manning's "n" for Gasaway Branch, Tributary A, and Tributary B ranged from 0.040 to 0.050 for the channels and from 0.045 to 0.060 for the overbank areas.

Starting water-surface elevations for Gasaway Branch, Tributary A, and Tributary B were determined using the slope-area option in the U.S. Army Corps of Engineers (COE) HEC-2 backwater computer program (Reference 5). Water-surface elevations of floods of the selected recurrence intervals for Gasaway Branch were developed using the COE HEC-2 computer program. Water-surface elevations for Tributary A and Tributary B were developed using Manning's equation.

Flood profiles were drawn showing the computed water-surface elevations for floods of the selected recurrence intervals. In cases where the 50- and 100-year flood elevations are close together, due to limitations of the profile scale, only the 100-year profile has been drawn.

The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations shown on the profiles are, thus, considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing flood plain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the 100- and 500-year

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flood plain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24000 with a contour interval of 10 feet (Reference 6).

For the streams studied by approximate methods, only the 100-year flood plain boundary was delineated using the Flood Hazard Boundary Map for the Village of Galatia (Reference 7).

Flood plain boundaries are indicated on the Flood Insurance Rate Map. On this map, the 100-year flood plain boundary corresponds to the boundary of the areas of special flood hazards (Zone A and numbered A zones) and the 500-year flood plain boundary corresponds to the boundary of areas of moderate flood hazards (Zone B). In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights.

Floodways were not computed for Gasaway Branch, Tributary A, or Tributary B.

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail affecting the Village of Galatia.

5.1 Reach Determinations

Reaches are defined as sections of flood plain that have relatively the same flood hazard, based on the weighted average difference in water-surface elevations between the 10- and 100-year floods. This difference may not have a variation greater than that indicated in the following table for more than 20 percent of the reach:

Average Difference Between 10- and 100-year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the riverine flooding sources of the Village of Galatia are shown on the Flood Profiles and summarized in Table 2, Flood Insurance Zone Data.

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5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a riverine reach is the weighted average difference between the 10- and 100-year flood water-surface elevations rounded to the nearest 0.5 foot, multiplied by 10, and shown as a 3-digit code. For example, if the difference between elevations is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations are shown or FHFs determined.
Zones A3, A4:	Special Flood Hazard Areas inundated by the 100-year flood, with base flood elevations shown, and zones subdivided according to FHFs.
Zone B:	Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- and 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and, areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community are summarized in Table 2, Flood Insurance Zone Data.

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (FEET NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
TRIBUTARY A							
REACH 1	0001	−1.5	−0.4	N/A	015	A3	VARIES—SEE MAP
TRIBUTARY B							
REACH 1	0001	−1.9	−0.5	N/A	020	A4	VARIES—SEE MAP
GASAWAY BRANCH							
REACH 1	0001	−1.8	−0.2	N/A	020	A4	VARIES—SEE MAP

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF GALATIA, IL
(SALINE CO.)

FLOOD INSURANCE ZONE DATA

TRIBUTARY A—TRIBUTARY B—GASAWAY BRANCH

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Village of Galatia is, for insurance purposes, the principal product of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines for riverine flooding sources show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

This study is in agreement with the Urban Water Damage report prepared for the Village of Galatia (Reference 1).

Due to its more detailed analysis, this Flood Insurance Study supersedes the previously printed Flood Hazard Boundary Map for the Village of Galatia (Reference 7).

7.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this study can be obtained by contacting the Natural and Technological Hazards Division, Federal Emergency Management Agency, 300 South Wacker Drive, Chicago, Illinois 60606.

8.0 REFERENCES AND BIBLIOGRAPHY

1. U.S. Army Corps of Engineers, Inventory and Analysis of Urban Water Damage Problems, Village of Galatia, Saline County, Illinois, August 1984.

2. U.S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Illinois, Washington, D.C., February 1982.

3. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey of Saline County, Illinois, June 1978.

4. U.S. Geological Survey, Illinois Department of Transportation, Techniques for Estimating Magnitude and Frequency of Floods in Illinois, 1977.

5. U.S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water-Surface Profiles Generalized Computer Program, Davis, California, November 1976.

6. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 10 feet: Galatia, Illinois, 1963; Harco, Illinois, 1963.

7. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Village of Galatia, Saline County, Illinois, January 1976.

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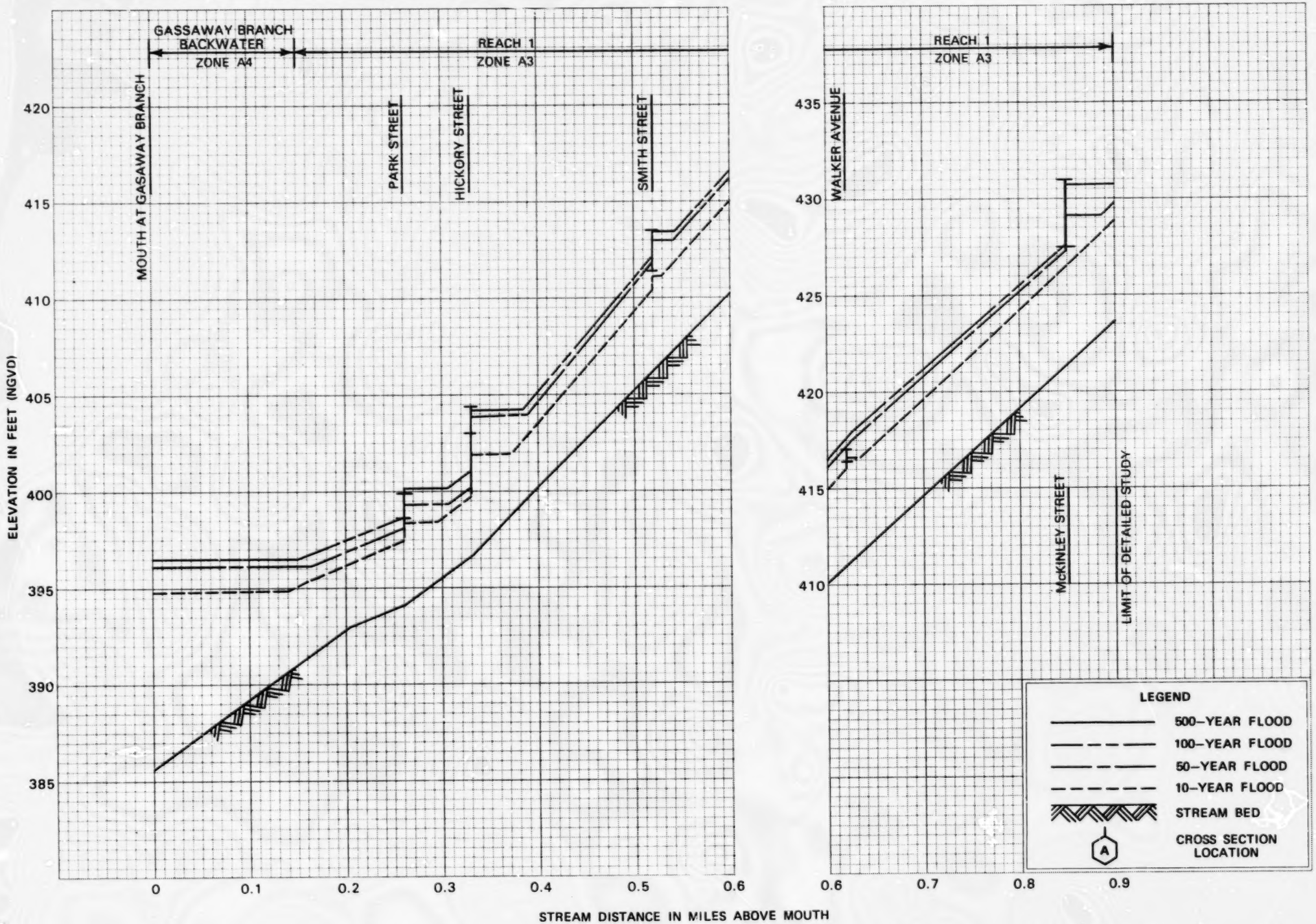

FLOOD PROFILES

TRIBUTARY A

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF GALATIA, IL
(SALINE CO.)

01P

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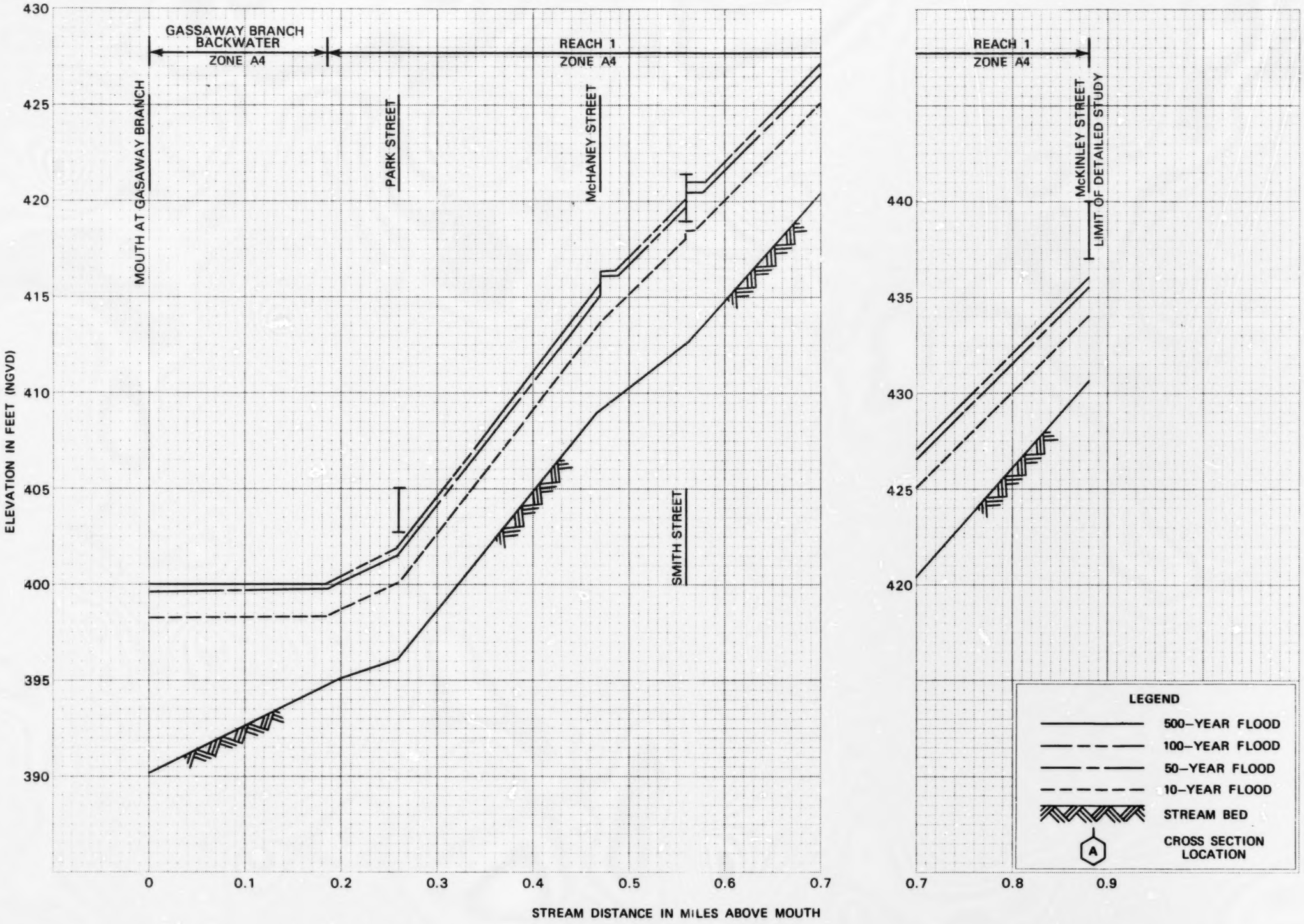

FLOOD PROFILES

TRIBUTARY B

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF GALATIA, IL
(SALINE CO.)

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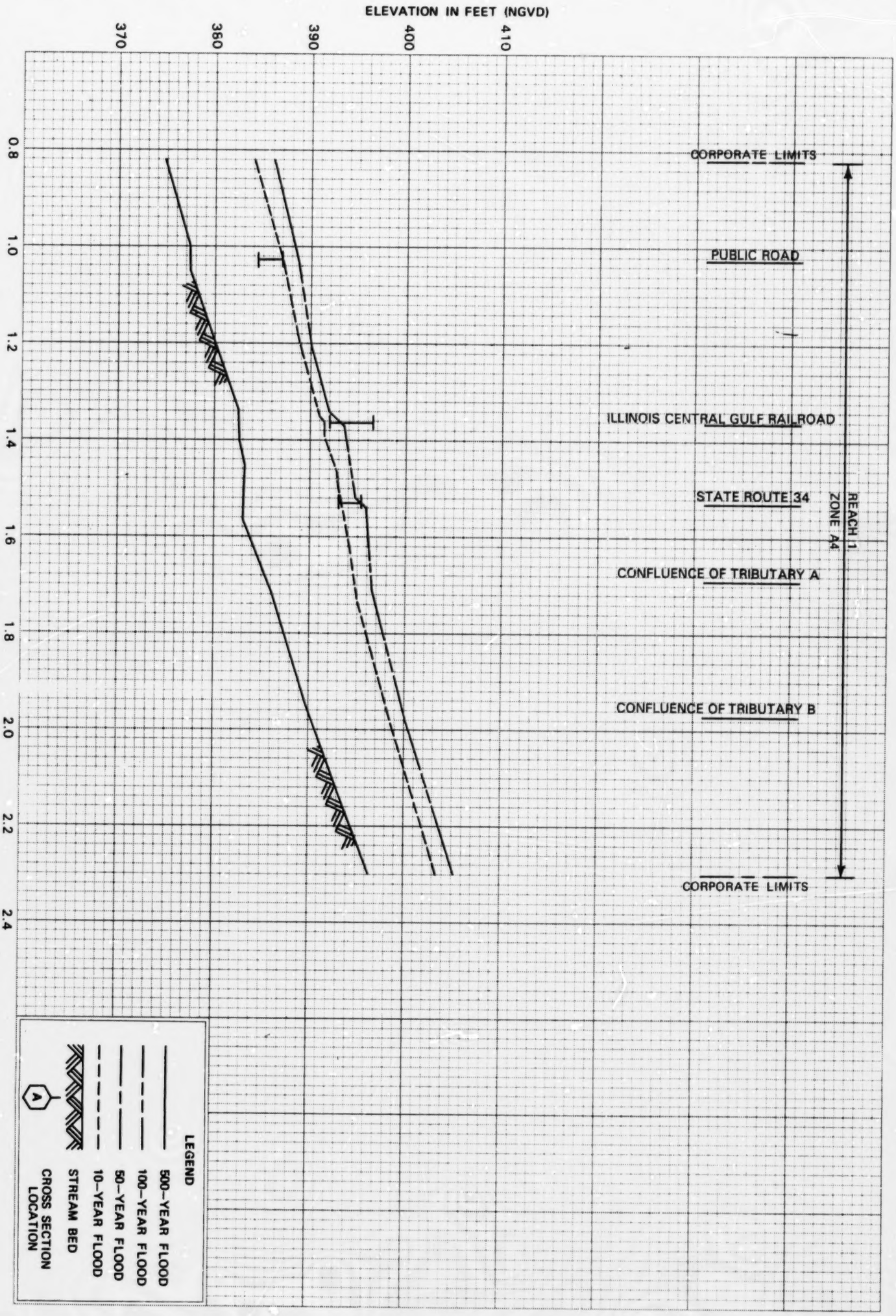

03P	FEDERAL EMERGENCY MANAGEMENT AGENCY **VILLAGE OF GALATIA, IL** (SALINE CO.)	**FLOOD PROFILES** **GASAWAY BRANCH**

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